SYSTEMATIC GERMPLASM COLLECTION OF GRAIN LEGUMES IN WEST AFRICA

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Plant breeders must meet the threat of impending food crises which may result from the ever increasing world population. New genetic inputs are needed in the large scale breeding programs which have been initiated to improve the grain legumes, as well as cereals and other crops. Yet these genetic resources are being continually lost in the regions where they occur. The native farmer ceases to grow indigenous agro-ecotypes adapted to local environmental conditions when new high yielding varieties are introduced. With the extension of communication systems, particularly road transport, agricultural innovations spread rapidly, to transform subsistence agriculture into a cash-produce economy. As a consequence, the farmer mostly grows that variety of a crop which the distant consumers prefer. The result is a slow but inevitable loss of plant genetic resources. The local varieties grown by farmers have come into existence through many cycles of selection specifically directed by the farmer toward his preferences and by nature toward adaptation to the habitat.

Exploration, collection and use of genetic variability in most crops have been generally haphazard and often aimless. A systematic collection program requires strict orientation, careful planning and inter-disciplinary coodination. Good logistic support is essential since the germplasm of most of our major crops is scattered widely, often in remote, not easily accessible areas.

The collector needs to be well informed about the range of variability in the crop before he starts collecting. He must be familiar with the wild and weedy forms of the crop and with related species. This knowledge is gained by visiting agricultural research stations and by studying regional floras and herbarium specimens. Further, he should acquire some knowledge of taboos associated with the crop and of local traditions, to facilitate field work. A rudimentary understanding of the local language is helpful, but the collector should rely on an interpreter for collection in remote areas. Interpreters are not difficult to find through contracts with local agricultural officers.

The collector should not rely on market samples, since crops grown by the farmers may not be on sale at the markets in that area. Surplus crops naturally are shipped to areas where there is demand. Hence the principal markets where a crop is sold are not necessarily located in the area where that crop is predominantly cultivated. For example, more than 80% of cowpea production in Nigeria is from the region north of 10^{o} latitude, yet at least 40% of the total production is sold in the markets of the Western State.

Field collections provide valuable information regarding the ecology of the crop and the prevalent gene flow among its wild, weedy and cultivated forms. Field sampling requires some prior knowledge of geographical variation of the crop. The number of sites to be sampled and the number of samples to be collected per site as single plant harvests packaged separately depend largely upon the collector's familiarity with the crop. Knowledge of the geographic distribution of diseases and pests gained during the field work provides useful information for plant protection measures.

Interviews of farmers provide information about local agronomic practices and the ethnobotany of the crop. The collector should gather data about farmers' special techniques and practices, as well as about local food preferences and how these are determined. These preferences indicate the direction of selection pressure that the farmer has exerted on a particular cultivar.

Systematic collection of cultivated grain legumes in West Africa was initiated at IITA in 1972. During a period of 57 days of active field collecting from October to December almost 14,000 miles were travelled in Nigeria. The Institute of Agricultural Research, Samaru, provided additional seed samples of grain legumes grown throughout the six northern states of Nigeria. Here the Agricultural Extension Service has a field staff which exceeds 250 men. The germplasm collected in these two expeditions is listed in Table 1.

Table 1. Germ plasm collection of Nigerian grain legumes in 1972

	Species	No. of Accessions
1.	Vigna unguiculata	
	(a) cultivated	394
	(b) wild and weedy	49
2.	Sphenostylis stenocarpa	42
3.	Voandzeia subterranea	22
4.	Phaseolus lunatus	16
5.	Cajanus cajan	5
6.	Mucuna sloanei	5
7.	Canavalia ensiformis	3
8.	Kirstingiella geocarpa	2
9.	Lablab niger	1

Morphological analysis of the Vigna unguiculata collections indicated extensive gene flow between the cultivated and weedy forms in Northern Nigeria. The roadside weedy V. unguiculata is recognized by the Hausa people as WAKEN BEYI BEYI (forbidden beans) and WAKEN GIZO (the bean that grows by itself). Waken Gizo is a common name for all introgression variants which are often harvested and consumed but never sown.

In the future this systematic collection of germplasm will be extended to cover the entire geographic distribution of Vigna unguiculata and other legumes in the lowland humid tropics.